

IN THE CLAIMS:

1. (Currently Amended) A tunable edge-emitting semiconductor laser ~~(10) including~~ comprising:

a resonant cavity delimited by ~~two reflectors (15, 20), one of which is a fixed reflector (15) and the other of which is an adjustable mobile reflector (20); and including~~
an active section ~~(1)~~ with a gain of length L_1 creating a first section of the resonant cavity; and
a tunable section ~~(2)~~ of length L_2 creating a second section of the resonant cavity, characterized ~~wherein~~ that the a total length of the cavity $L = L_1 + L_2$ is less than or equal to 20 μm .

2. (Currently Amended) ~~A~~ The tunable laser according to claim 1, ~~characterized in wherein~~ that the length L_1 of the active section ~~(1)~~ is from 5 μm to 12 μm .

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3. (Currently Amended) ~~A~~ The tunable laser according to claim 1, ~~characterized in that~~ wherein the length L_2 of the tunable section ~~(2)~~ depends on the tuning range of the laser in accordance with the following equation:

$$\Delta\lambda = \lambda^2 / 2(n_1 L_1 + n_2 L_2)$$

where $\Delta\lambda$ is the tuning range of the laser,

λ is the emission wavelength of the laser, and

n_1, n_2 are the respective refractive indices of the first and second sections of the laser cavity.

4. (Currently Amended) ~~The~~ A tunable laser according to claim 3, ~~characterized in that it~~ wherein the tunable laser has a continuous tuning range $\Delta\lambda$ greater than or equal to 30 nm.

5. (Currently Amended) ~~The~~A tunable laser according to claim 1, ~~characterized in that wherein~~ the fixed reflector (15) and the adjustable ~~mobile~~ reflector (20) each have a reflectivity greater than or equal to 90%.
6. (Currently Amended) ~~A-The~~ tunable laser according to claim 1, ~~wherein~~ characterized in that the fixed reflector (15) is an etched mirror.
7. (Currently Amended) ~~The~~A tunable laser according to claim 6, ~~characterized in that wherein~~ the etched mirror of the fixed reflector (15) is an alternation of semiconductor and air.
8. (Currently Amended) The tunable laser according to claim 6, ~~characterized in that wherein~~ the etched mirror of the fixed reflector (15) is an alternation of polymer and air.
9. (Currently Amended) ~~The~~A tunable laser according to claim 6, ~~characterized in that wherein~~ the etched mirror of the fixed reflector (15) is an alternation of semiconductor and polymer.
10. (Currently Amended) ~~The~~A tunable laser according to claim 6, ~~characterized in that wherein~~ the fixed reflector (15) is on the a front face of the active section (1).
11. (Currently Amended) ~~A-The~~ tunable laser according to claim 1, ~~characterized in that wherein~~ the a rear face of the active section (1) is antireflection treated.
12. (Currently Amended) ~~A-The~~ tunable laser according to claim 1, ~~characterized in that the mobile~~ wherein the adjustable reflector (20) is a mirror external to the laser cavity.

13. (Currently Amended) ~~A~~The tunable laser according to claim 12, characterized in that the ~~mobile-adjustable~~ reflector (20) is of etched silicon.

14. (Currently Amended) ~~The~~A tunable laser according to claim 12, ~~characterized wherein~~ that the ~~mobile-adjustable~~ reflector (20) is of nickel.

15. (Currently Amended) ~~A~~The tunable laser according to claim 12, ~~characterized in that~~ wherein the ~~mobile-adjustable~~ reflector (20) is of dielectric deposited on silicon.

16. (Currently Amended) ~~A~~The tunable laser according to any one of claims 12, ~~characterized in that wherein~~ the mobile reflector (20) is controlled by a micro-electro-mechanical (MEM) controller.

17. (Currently Amended) The ~~A~~-tunable laser according to claim 1, ~~characterized in that~~ wherein the tunable section (2) is an air area.

18. (Currently Amended) ~~A~~The tunable laser according to claim 1, ~~characterized in that~~ wherein the tunable section (2) is a gas area.

19. (Currently Amended) ~~A~~The method of fabricating a tunable edge-emitting semiconductor laser according to claims 1, ~~characterized in that it includes the following steps~~ further comprising of:

- producing a laser die (10) including a substrate (8) and an active layer (11) consisting of a gain medium, the length L_1 of the gain medium being from 5 μm to 12 μm ,
- ~~producing~~ fabricating a fixed etched mirror (15) on the front face of the laser die (10),
- mounting the laser die (10) on a base (50), and

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- producing a mobile reflector (20) on the base (50) to the rear of the laser die (10).

20. (Currently Amended) A-~~The method according to claim 19, characterized in that wherein producing~~ fabricating the etched mirror (15) ~~further comprises~~ includes the following steps:

- etching the active layer of the laser die,
- depositing a polymer in the etched area, and
- etching the polymer to constitute a mirror.

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21. (Currently Amended) A-~~The method according to claim 19, characterized in that wherein producing~~ fabricating the etched mirror (15) ~~further comprises~~ includes the following steps:

- etching the active layer of the laser die,
- furthering epitaxial growth in the etched area of an undoped semiconductor transparent at the emission wavelength, and
- etching the transparent undoped semiconductor to constitute a mirror.

22. (Currently Amended) A-~~The method according to claim 21, characterized in that wherein producing~~ fabricating the etched mirror (15) ~~further includes~~ comprises a step of depositing a polymer in the etched regions of the transparent undoped semiconductor.

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IN THE DRAWINGS.

Applicant encloses as an Appendix two replacement drawing sheets which include figures 2a, 2b, and 6.